APPENDIX D. Baseline Occupational Short-and Intermediate-Term Dermal, Inhalation and Total Risks to Dimethoate

Exposure Scenario (Scen #)	Baseline Dermal Unit Exposure (mg/lb ai)[a]	Baseline Inhalation Unit Exposure (ug/lb ai)[b]	Maximum Application Rate (lb ai/A)[c]	Daily Acres Treated[d]	Baseline Inhalation Dose (mg/kg/d)[e]	Baseline Inhalation MOE[f]		Baseline Dermal Dose (mg/kg/d)[g]		Baseline Dermal MOE[h]		Baseline Total Daily Dose (mg/kg/d)[I]		Total MOE[j]	
						Short-term (UF 100)	Int.-term (UF 300)	Short-term	Int.-term	Short-term (UF 100)	Int.-term (UF 300)	Short-term	Int.-term	Short-term (UF 100)	Int.-term (UF 300)
Mixer/Loader Risks															
Mixing/Loading Liquids for Aerial/Chemigation Application (1a)	2.9	1.2	4.0	350	0.024	83	130	58	6.4	0.17	0.5	58	6.4	0.17	0.5
			2.0		0.012	170	270	29	3.2	0.34	911	29	3.2	0.34	1
			0.67		0.004	500	800	9.7	1.1	1.0	3	9.7	1.1	1.0	3
			0.5		0.003	670	1100	7.3	0.8	1.4	4	7.3	0.8	1.4	4
			0.33		0.002	1000	1600	4.8	0.53	2.1	6.1	4.8	0.53	2.1	6.1
			0.25		0.0015	1300	2100	3.6	0.4	2.8	8	3.6	0.4	2.8	8
			0.16		0.00096	2100	3300	2.3	0.26	4.3	13	2.3	0.26	4.3	12
Mixing/Loading Liquids for Groundboom Application (1b)			4.0	80	0.0055	360	580	13	1.5	0.75	2.2	13	1.5	0.75	2.2
			2.0		0.0027	730	1200	6.6	0.73	1.5	4.4	6.6	0.73	1.5	4.4
			0.67		0.00092	2200	3500	2.2	0.24	4.5	13	2.2	0.25	4.5	13
			0.5		0.00069	2900	4700	1.7	0.18	6	18	1.7	0.18	6	17
			0.33		0.00045	4400	7100	1.1	0.12	9.1	27	1.1	0.12	9.1	26
			0.25		0.00034	5800	9300	0.83	0.091	12	35	0.83	0.091	12	35
			0.16		0.00022	9100	15000	0.53	0.058	19	55	0.53	0.059	19	55
Mixing/Loading Liquids for Airblast Sprayer (1c)			33.2	20	0.011	180	280	28	3	0.4	1.1	28	3.0	0.4	1.1
			8.3		0.0028	700	1100	6.0	0.76	1.5	4.2	6.9	0.76	1.5	4.2
			4.0	40	0.0027	730	1200	6.6	0.73	1.5	4.4	6.6	0.73	1.5	4.4
			2.0		0.0014	1500	2300	3.3	0.36	3	8.8	3.3	0.37	3	8.7
			0.5		0.00034	5800	9300	0.83	0.091	12	35	0.83	0.091	12	35
			0.33		0.00023	8800	14000	0.55	0.06	18	53	0.55	0.06	18	53

APPENDIX D. Baseline Occupational Short-and Intermediate-Term Dermal, Inhalation and Total Risks to Dimethoate (continued)

Exposure Scenario (Scen #)	Baseline Dermal Unit Exposure (mg/lb ai)[a]	Baseline Inhalation Unit Exposure (ug/lb ai)[b]	Maximum Application Rate (lb ai/A)[c]	Daily Acres Treated[d]	Baseline Inhalation Dose (mg/kg/d)[e]	Baseline Inhalation MOE[f]		Baseline Dermal Dose (mg/kg/d)[g]		Baseline Dermal MOE[h]		Baseline Total Daily Dose (mg/kg/d)[I]		Total MOE[j]	
						Short-term (UF 100)	Int.-term (UF 300)	Short-term	Int.-term	Short-term (UF 100)	Int.-term (UF 300)	Short-term	Int.-term	Short-term (UF 100)	Int.-term (UF 300)
Mixing/Loading Wettable-Powders for Aerial/Chemigation Application (2a)	3.7	43	2.0	350	0.43	4.7	7.4	37	4.1	0.27	0.79	37	4.5	0.26	0.71
Mixing/Loading Wettable-Powders for Groundboom Application (2b)			2.0	80	0.098	20	33	8.5	0.93	1.2	3.4	8.6	1.0	1.1	3.1
Mixing/Loading Wettable Powders for Airblast Sprayer (2c)			2.0	40	0.049	41	65	4.2	0.47	2.4	6.9	4.3	0.51	2.2	6.2
Mixing/Loading Wettable Powders for Non-crop land adjacent to vineyards (2d)			2.0	10	0.012	160	260	1.1	0.12	9.5	28	1.1	0.13	8.9	25
Applicator Risks															
Applying Liquids with Aircraft (3)	See Eng. Controls	See Eng. Controls	4.0 2.0 0.67 0.5 0.33 0.25 0.16	350	See Eng. Cont.	See Eng. Cont.	See Eng. Cont.	See Eng. Cont.	See Eng. Cont.	See Eng. Cont.	See Eng. Cont.	See Eng. Cont.	See Eng. Cont.	See Eng. Cont.	See Eng. Cont.
Applying Liquids with Helicopter Aircraft (4)	Insuff. Data (see applying liquids with aircraft)	Insuff. Data (see applying liquids with aircraft)	same as aircraft	350	See Eng. Cont.	See Eng. Cont.	See Eng. Cont.	See Eng. Cont.	See Eng. Cont.	See Eng. Cont.	See Eng. Cont.	See Eng. Cont.	See Eng. Cont.	See Eng. Cont.	See Eng. Cont.

APPENDIX D. Baseline Occupational Short-and Intermediate-Term Dermal, Inhalation and Total Risks to Dimethoate (continued)

Exposure Scenario (Scen #)	Baseline Dermal Unit Exposure (mg/lb ai)[a]	Baseline Inhalation Unit Exposure (ug/lb ai)[b]	Maximum Application Rate (lb ai/A)[c]	Daily Acres Treated[d]	Baseline Inhalation Dose (mg/kg/d)[e]	Baseline Inhalation MOE[f]		Baseline Dermal Dose (mg/kg/d)[g]		Baseline Dermal MOE[h]		Baseline Total Daily Dose (mg/kg/d)[I]		Total MOE[j]	
						Short-term (UF 100)	Int.-term (UF 300)	Short-term	Int.-term	Short-term (UF 100)	Int.-term (UF 300)	Short-term	Int.-term	Short-term (UF 100)	Int.-term (UF 300)
Applying Liquids with a Groundboom Sprayer (5)	0.014	0.74	4.0	80	0.0034	590	950	0.064	0.007	160	450	0.067	0.01	120	310
			2.0		0.0017	1200	1900	0.032	0.0035	310	910	0.034	0.0052	250	610
			0.67		0.00057	3500	5600	0.011	0.0012	930	2700	0.011	0.0017	740	1800
			0.5		0.00042	4700	7600	0.008	0.00088	1300	3600	0.0084	0.0013	990	2500
			0.33		0.00028	7200	11000	0.0053	0.00058	1900	5500	0.0056	0.0009	1500	3700
			0.25		0.00021	9500	15000	0.0040	0.00044	2500	7300	0.0042	0.0007	2000	4900
			0.16		0.00014	15000	24000	0.0026	0.00028	3900	11000	0.0027	0.0004	3100	7700
Applying Liquids Using a Paintbrush (6)	180	280	2 lb ai/gal	2 gal	0.016	130	200	10	1.1	0.97	2.8	10	1.1	0.96	2.8
Applying Liquids Using an Airblast Sprayer (7)	0.36	4.5	33.2	20	0.043	47	75	3.4	0.38	2.9	8.5	3.5	0.42	2.8	7.6
			8.3		0.011	190	300	0.85	0.094	12	34	0.86	0.10	11	31
			4.0	40	0.01	190	310	0.82	0.91	12	35	0.83	0.1	11	32
			2.0		0.0051	390	620	0.41	0.045	24	71	0.42	0.05	23	63
			0.5		0.0013	1600	2500	0.1	0.011	97	280	0.10	0.013	92	250
			0.33		0.00085	2400	3800	0.068	0.0075	150	430	0.069	0.0083	140	380
Applying Ready-to-Use Liquids (8)	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Applying Liquids to Non-crop land adjacent to vineyards (rights-of-way data) (9)	1.3	3.9	2	10	0.0011	1800	2900	0.37	0.041	27	78	0.37	0.042	27	76
Mixer/Loader/Applicator Risks															
Soil Injection (10)	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Backpack Sprayer/Knapsack (11)	No Data See PPE	30	0.10 lb ai/gal	40 gal	0.0017	1200	1900	See PPE	See PPE	See PPE	See PPE	See PPE	See PPE	See PPE	See PPE
			0.06 lb ai/gal		0.001	1900	3100	See PPE	See PPE	See PPE	See PPE	See PPE	See PPE	See PPE	See PPE

APPENDIX D. Baseline Occupational Short-and Intermediate-Term Dermal, Inhalation and Total Risks to Dimethoate (continued)

Exposure Scenario (Scen #)	Baseline Dermal Unit Exposure (mg/lb ai)[a]	Baseline Inhalation Unit Exposure (ug/lb ai)[b]	Maximum Application Rate (lb ai/A)[c]	Daily Acres Treated[d]	Baseline Inhalation Dose (mg/kg/d)[e]	Baseline Inhalation MOE[f]		Baseline Dermal Dose (mg/kg/d)[g]		Baseline Dermal MOE[h]		Baseline Total Daily Dose (mg/kg/d)[I]		Total MOE[j]	
						Short-term (UF 100)	Int.-term (UF 300)	Short-term	Int.-term	Short-term (UF 100)	Int.-term (UF 300)	Short-term	Int.-term	Short-term (UF 100)	Int.-term (UF 300)
			0.01 lb ai/gal		0.00017	12000	19000	See PPE	See PPE	See PPE	See PPE	See PPE	See PPE	See PPE	See PPE
Low Pressure Handwand (liquid formulation) (12)	100	30	0.10 lb ai/gal	40 gal	0.0017	1200	1900	5.7	0.63	1.8	5.1	5.7	0.63	1.7	5.1
			0.06 lb ai/gal		0.001	1900	3100	3.4	0.38	2.9	8.5	3.4	0.38	2.9	8.5
			0.01 lb ai/gal		0.00017	12000	19000	0.57	0.063	18	51	0.57	0.063	17	51
High Pressure Handwand (13)	No Data See PPE	120	0.10 lb ai/gal	1000 gal	0.17	12	19	See PPE	See PPE	See PPE	See PPE	See PPE	See PPE	See PPE	See PPE
			0.06 lb ai/gal		0.1	19	31	See PPE	See PPE	See PPE	See PPE	See PPE	See PPE	See PPE	See PPE
			0.01 lb ai/gal		0.017	120	190	See PPE	See PPE	See PPE	See PPE	See PPE	See PPE	See PPE	See PPE
Sprinkler Can (14)	No Data	No Data	0.10 lb ai/gal	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
			0.06 lb ai/gal												
			0.01 lb ai/gal												
Drencher (Soil Drench) (15)	No Data	No Data	1.0/2.0	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Flagger Risks															
Flagging (Sprays) (16)	0.011	0.35	4.0	350	0.007	290	460	0.22	0.024	45	130	0.23	0.031	39	100
			2.0		0.0035	570	910	0.11	0.012	91	260	0.11	0.016	78	210
			0.67		0.0012	1700	2700	0.037	0.0041	270	790	0.038	0.0052	230	610
			0.5		0.00088	2300	3700	0.028	0.003	360	1100	0.028	0.0039	310	820
			0.33		0.00058	3500	5500	0.018	0.002	550	1600	0.019	0.0026	480	1200
			0.25		0.00044	4600	7300	0.014	0.0015	730	2100	0.014	0.0020	630	1600
			0.16		0.00028	7100	11000	0.0088	0.00097	1100	3300	0.0091	0.0012	980	2600

a Baseline Dermal Unit Exposure represents long pants, long sleeved shirt, no gloves, open mixing/loading, and open cab tractors as appropriate. In some cases, appropriate protection factors were applied to calculate baseline exposures using available data (see *Exposure Scenarios Descriptions Table* for further information).

b Baseline Inhalation Exposure represents no respiratory protection.

c Application rates are based on maximum values found in various sources including LUIS and various labels. In most scenarios, a range of maximum application rates is used to represent the range of rates for different crops/sites/uses. Most application rates upon which the analysis is based are presented as lb ai/A. In some cases, the application rate is based on applying a solution at concentrations specified by the label (i.e., presented as lb ai/gallon). Specific application rates and the corresponding EPA Reg. numbers that are intended as examples of each exposure assessment scenario are presented below:

- 33.2 lb/A EC formulations: conifer nursery (memo 10/14/99 Weyerhaeuser)
- 8.3 lb/A EC formulations: conifer nursery (memo 10/14/99 Weyerhaeuser)
- 4.0 lb/A EC formulations: ornamentals (EPA Reg. No. 5905-493)
- 2.0 lb/A EC formulations: citrus - foliar application (EPA Reg. No. 19713-232); ornamentals
- 1.0 lb/A EC formulations: citrus - soil drench
- 0.67 lb/A EC formulations: wheat
- 0.5 lb/A EC formulations: broccoli, cabbage, cauliflower, field corn, sorghum, citrus (foliar applications), melons, watermelons, tomatoes, beans (excluding cowpeas), lentils, soybeans, celery, alfalfa, pears, apples, potatoes, cotton, and safflower
- 0.33 lb/A EC formulations: peppers, cherries, and pecans
- 0.25 lb/A EC formulations: collards, kale, mustard greens, endive (escarole), head lettuce, leaf lettuce, spinach, swiss chard, and turnips; current label - lettuce (EPA Reg. No. 5905-497)
- 0.16 lb/A EC formulations: peas
- 2.0 lb/A WP formulations: grapes (EPA Reg. No. 2749-134); non-crop land adjacent to vineyards (rights-of-way data) in California
- 0.10 lb ai/gal EC formulations: ornamentals; current label - agricultural buildings/poultry industry (EPA Reg. No. 1386-449)
- 0.06 lb ai/gal EC formulations: ornamentals; current label - agricultural buildings/poultry industry (EPA Reg. No. 51036-198)
- 0.01lb/ gal EC formulations: ornamentals (EPA Reg. No. 572-224)

d Daily acres treated values are from EPA estimates of acreage that could be treated or volume handled in a single day for each exposure scenario of concern based on the application method and formulation/packaging type.

e Baseline Inhalation Dose (mg/kg/d) = (unit exposure (μg/lb ai) * (1mg/1000 μg) conversion * appl. rate (lb ai/A) * acres treated/day)/body weight (70 kg) [Note: application rate and acres treated/day are replaced by concentration (lb ai/gal) and gallons used/day (gal/day) if appropriate handheld types of equipment are used (e.g., low pressure handwand, backpack, or high pressure handwand sprayers).]

f Short-term inhalation MOE = NOAEL (2.0 mg/kg/d) / short-term inhalation dose. UF = 100.
Intermediate-term inhalation MOE = LOAEL (3.2 mg/kg/d) / intermediate-term inhalation dose. UF = 300.

g Daily dermal dose (mg/kg/d) = [unit dermal exposure (mg/lb ai) * application rate (lb ai/acre) * daily acres treated * dermal absorption (11% for intermediate-term assessment and 100% for short-term assessment)]/ body weight (70 kg).

h Short-term dermal MOE = NOAEL (10 mg/kg/d) / short-term daily dermal dose. UF = 100.
Intermediate-term dermal MOE = LOAEL (3.2 mg/kg/d). UF = 300.

I Total daily dose (mg/kg/d) = daily inhalation dose (mg/kg/d) + daily dermal dose (mg/kg/d).

j Total MOE =

$$\frac{1}{\frac{1}{\text{dermal MOE}} + \frac{1}{\text{inhalation MOE}}}$$

APPENDIX E. PPE Mitigated Occupational Short-and Intermediate-term Inhalation, Dermal and Total Risks for Dimethoate

Exposure Scenario (Scen. #)	Maximum Application Rate (lb ai/A)	Additional PPE Mitigation Measures[a]										
		Unit Dermal Exposure[b] (mg/lb ai)	Unit Inhalation Exposure[b] (μg/lb ai)	Dermal				Inhalation			Total MOE[g]	
				Daily Dose[c] (mg/kg/d)		MOE[d]		Daily Dose[e] (mg/kg/d)	MOE[f]			
				Short-term (UF=100)	Int.-term (UF=300)	Short-term (UF=100)	Int.-term (UF=300)		Short-term (UF=100)	Int.-term (UF=300)	Short-term (UF=100)	Int.-term (UF=300)
Mixer/Loader Risks												
Mixing/Loading Liquids for Aerial/Chemigation Application (1a)	4.0	0.017 g,dl 0.023 g	0.24	0.34 g,dl	0.037 g,dl	29 g,dl	86 g,dl	0.0048 r	420 r	670 r	27 g,dl,r	76 g,dl,r
	2.0			0.17 g,dl	0.019 g,dl	59 g,dl	170 g,dl	0.0024 r	830 r	1300 r	55 g,dl,r	150 g,dl,r
	0.67			0.077 g	0.0063 g,dl	130 g	510 g,dl	Not needed	Not needed	Not needed	100 g	310 g,dl
	0.5			0.058 g	0.0063 g	170 g	510 g	Not needed	Not needed	Not needed	140 g	340 g
	0.33			0.038 g	0.0042 g	260 g	770 g	Not needed	Not needed	Not needed	210 g	520 g
	0.25			0.029 g	0.0032 g	350 g	1000 g	Not needed	Not needed	Not needed	280 g	690 g
	0.16			0.018 g	0.002 g	540 g	1600 g	Not needed	Not needed	Not needed	430 g	1100 g
Mixing/Loading Liquids for Groundboom Application (1b)	4.0			0.078 g,dl	0.0085 g,dl	130 g,dl	370 g, dl	0.0011 r 0.0055 nr	1800 r 365 nr	2900 r 580 nr	120 g,dl,r 95 g,dl	330 g,dl,r 230 g,dl
	2.0			0.053 g	0.0058 g	190 g	550 g	Not needed	Not needed	Not needed	150 g	380 g
	0.67			0.018 g	0.0019 g	570 g	1700 g	Not needed	Not needed	Not needed	450 g	1100 g
	0.5			0.013 g	0.0014 g	760 g	2200 g	Not needed	Not needed	Not needed	600 g	1500 g
	0.33			0.0087 g	0.00095 g	1200 g	3400 g	Not needed	Not needed	Not needed	910 g	2300 g
	0.25			0.0066 g	0.00072 g	1500 g	4400 g	Not needed	Not needed	Not needed	1200 g	3000 g
	0.16			0.0042 g	0.00046 g	2400 g	6900 g	Not needed	Not needed	Not needed	1900 g	4700 g
Mixing/Loading Liquids for Airblast Sprayer (1c)	33.2			0.16 g,dl	0.018 g,dl	62 g, dl	160g, dl	0.0023 r	Not needed	1400 r	46 g,dl	160 g,dl,r
	8.3			0.055 g	0.0060 g	180 g	530 g	Not needed	Not needed	Not needed	150 g	360 g
	4.0			0.053 g	0.0058 g	190 g	550 g	Not needed	Not needed	Not needed	150 g	380 g
	2.0			0.026 g	0.0029 g	380 g	1100 g	Not needed	Not needed	Not needed	300 g	750 g
	0.5			0.0066 g	0.00072 g	1500 g	4400 g	Not needed	Not needed	Not needed	1200 g	3000 g
	0.33			0.0043 g	0.00048 g	2300 g	6700 g	Not needed	Not needed	Not needed	1800 g	4500 g

APPENDIX E. PPE Mitigated Occupational Short-and Intermediate-term Inhalation, Dermal and Total Risks for Dimethoate (continued)

Exposure Scenario (Scen. #)	Maximum Application Rate (lb ai/A)	Additional PPE Mitigation Measures[a]										
		Unit Dermal Exposure[b] (mg/lb ai)	Unit Inhalation Exposure[b] (μg/lb ai)	Dermal				Inhalation			Total MOE[g]	
				Daily Dose[c] (mg/kg/d)		MOE[d]		Daily Dose[e] (mg/kg/d)	MOE[f]			
				Short-term (UF=100)	Int.-term (UF=300)	Short-term (UF=100)	Int.-term (UF=300)		Short-term (UF=100)	Int.-term (UF=300)	Short-term (UF=100)	Int.-term (UF=300)
Mixing/Loading Wettable-Powders for Aerial/Chemigation Application (2a)	2.0	0.13 g,dl 0.17 g	8.6	1.3 g,dl	0.14 g,dl	7.7 g,dl	22 g,dl	0.086 r	23 r	37 r	5.8 g,dl,r	14 g,dl,r
Mixing/Loading Wettable-Powders for Groundboom Application (2b)	2.0			0.3 g,dl	0.033 g,dl	34 g,dl	98 g,dl	0.02 r	100 r	160 r	25 g,dl,r	61 g,dl,r
Mixing/Loading Wettable-Powders for Airblast Sprayer (2c)	2.0			0.15 g,dl	0.016 g,dl	67 g,dl	200 g,dl	0.0098 r	200 r	330 r	51g,dl,r	120 g,dl,r
Mixing/Loading Wettable Powders for Non-crop land adjacent to vineyards (2d)	2.0			0.037 g,dl	0.0053 g	270 g,dl	600 g	0.0025 r 0.012 nr	810r 160 nr	1300 r 260 nr	100 g, dl 160 g,r	200 g,dl 410 g,r
Applicator Risks												
Applying Liquids with Aircraft (3)	4.0	See Eng. Controls	See Eng. Controls	See Eng. Controls	See Eng. Controls	See Eng. Controls	See Eng. Controls	See Eng. Controls	See Eng. Controls	See Eng. Controls	See Eng. Controls	See Eng. Controls
	2.0											
	0.67											
	0.5											
	0.33											
	0.25											
	0.16											

APPENDIX E. PPE Mitigated Occupational Short-and Intermediate-term Inhalation, Dermal and Total Risks for Dimethoate (continued)

Exposure Scenario (Scen. #)	Maximum Application Rate (lb ai/A)	Additional PPE Mitigation Measures[a]										
		Unit Dermal Exposure[b] (mg/lb ai)	Unit Inhalation Exposure[b] (μg/lb ai)	Dermal				Inhalation			Total MOE[g]	
				Daily Dose[c] (mg/kg/d)		MOE[d]		Daily Dose[e] (mg/kg/d)	MOE[f]			
				Short-term (UF=100)	Int.-term (UF=300)	Short-term (UF=100)	Int.-term (UF=300)		Short-term (UF=100)	Int.-term (UF=300)	Short-term (UF=100)	Int.-term (UF=300)
Applying Liquids with Helicopter Aircraft (4)		Insuffic. data (see apply liquids with aircraft)	Insuffic. data (see apply liquids with aircraft)	Insuffic. data (see apply liquids with aircraft)	Insuffic. data (see apply liquids with aircraft)	Insuffic. data (see apply liquids with aircraft)	Insuffic. data (see apply liquids with aircraft)	Insuffic. data (see apply liquids with aircraft)	Insuffic. data (see apply liquids with aircraft)	Insuffic. data (see apply liquids with aircraft)	Insuffic. data (see apply liquids with aircraft)	Insuffic. data (see : apply liquids with aircraft)
Applying Liquids with a Groundboom Sprayer (5)	4.0	0.011 g,dl 0.014 g	0.15	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	2.0			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.67			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.5			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.33			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.25			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.16			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
Applying Liquids Using a Paintbrush (6)	2 lb ai/gal	22 g,dl 24 g	56	1.3 g,dl	0.14 g,dl	8 g,dl	23 g,dl	Not needed	Not needed	Not needed	7.5 g,dl	21 g,dl

APPENDIX E. PPE Mitigated Occupational Short-and Intermediate-term Inhalation, Dermal and Total Risks for Dimethoate (continued)

Exposure Scenario (Scen. #)	Maximum Application Rate (lb ai/A)	Additional PPE Mitigation Measures[a]										
		Unit Dermal Exposure[b] (mg/lb ai)	Unit Inhalation Exposure[b] (μg/lb ai)	Dermal				Inhalation			Total MOE[g]	
				Daily Dose[c] (mg/kg/d)		MOE[d]		Daily Dose[e] (mg/kg/d)	MOE[f]			
				Short-term (UF=100)	Int.-term (UF=300)	Short-term (UF=100)	Int.-term (UF=300)		Short-term (UF=100)	Int.-term (UF=300)	Short-term (UF=100)	Int.-term (UF=300)
Applying Liquids Using an Airblast Sprayer (7)	33.2	0.22 g,dl 0.24 g	0.90	2.1 g,dl	0.23 g,dl	4.8 g,dl	14 g,dl	0.0085 r	230 r	370 r	4.7 g,dl,r	13 g,dl,r
	8.3			0.52 g, dl	0.057 g,dl	19 g,dl	56 g,dl	0.0021	940	1500	19 g,dl,r	54 g,dl,r
	4.0			0.5 g,dl	0.055 g,dl	20 g,dl	58 g,dl	Not needed	Not needed	Not needed	18 g,dl	49 g,dl
	2.0			0.25 g,dl	0.028 g,dl	40 g,dl	120 g,dl	Not needed	Not needed	Not needed	36 g,dl	98 g,dl
	0.5			0.069 g	0.0075 g	150 g	420 g	Not needed	Not needed	Not needed	130 g	360 g
	0.33			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
Applying Ready-to-Use Liquids (8)	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Applying Liquids to Non-crop land adjacent to vineyards (rights-of-way data) (9)	2	0.29 g,dl 0.38 g	0.78	0.083 g,dl	0.0091 g,dl	120 g,dl	350 g,dl	Not needed	Not needed	Not needed	110 g,dl	310 g,dl
Mixer/Loader/Applicator Risks												
Soil Injection (10)	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Backpack Sprayer and Knapsack Sprayer (11)	0.10 lb ai/gal	1.6 g,dl 2.5 g	6.0	0.091 g,dl	0.01 0 g,dl	110 g,dl	320 g,dl	0.00034 r 0.0017 nr	5800 r 1200 nr	9300 r 1900 nr	110 g,dl,r 100 g,dl	310 g,dl,r 270 g,dl
	0.06 lb ai/gal			0.086 g	0.0094 g	120 g	340 g	Not needed	Not needed	Not needed	110 g	310 g
	0.01 lb ai/gal			0.014 g	0.0016 g	700 g	2000 g	Not needed	Not needed	Not needed	660 g	1800 g
Low Pressure Handwand (12)	0.10 lb ai/gal	0.37 g,dl 0.43 g	6.0	0.025 g	0.0027 g	410 g	1200 g	Not needed	Not needed	Not needed	300 g	720 g
	0.06 lb ai/gal			0.015 g	0.0016 g	680 g	2000 g	Not needed	Not needed	Not needed	500 g	1200 g

APPENDIX E. PPE Mitigated Occupational Short-and Intermediate-term Inhalation, Dermal and Total Risks for Dimethoate (continued)

Exposure Scenario (Scen. #)	Maximum Application Rate (lb ai/A)	Additional PPE Mitigation Measures[a]										
		Unit Dermal Exposure[b] (mg/lb ai)	Unit Inhalation Exposure[b] (μg/lb ai)	Dermal				Inhalation			Total MOE[g]	
				Daily Dose[c] (mg/kg/d)		MOE[d]		Daily Dose[e] (mg/kg/d)	MOE[f]			
				Short-term (UF=100)	Int.-term (UF=300)	Short-term (UF=100)	Int.-term (UF=300)		Short-term (UF=100)	Int.-term (UF=300)	Short-term (UF=100)	Int.-term (UF=300)
	0.01 lb ai/gal			0.0025 g	0.00027 g	4100 g	12000 g	Not needed	Not needed	Not needed	3000 g	7200 g

APPENDIX E. PPE Mitigated Occupational Short-and Intermediate-term Inhalation, Dermal and Total Risks for Dimethoate (continued)

Exposure Scenario (Scen. #)	Maximum Application Rate (lb ai/A)	Additional PPE Mitigation Measures[a]										
		Unit Dermal Exposure[b] (mg/lb ai)	Unit Inhalation Exposure[b] (μg/lb ai)	Dermal				Inhalation			Total MOE[g]	
				Daily Dose[c] (mg/kg/d)		MOE[d]		Daily Dose[e] (mg/kg/d)	MOE[f]			
				Short-term (UF=100)	Int.-term (UF=300)	Short-term (UF=100)	Int.-term (UF=300)		Short-term (UF=100)	Int.-term (UF=300)	Short-term (UF=100)	Int.-term (UF=300)
High Pressure Handwand (13)	0.10 lb ai/gal	1.6 g,dl	24	2.3 g,dl	0.25 g,dl	4.4 g,dl	13 g,dl	0.034 r	58 r	93 r	4.1 g,dl,r	11 g,dl,r
	0.06 lb ai/gal			1.4 g,dl	0.15 g,dl	7.3 g,dl	21 g,dl	0.021 r	97 r	160 r	6.8 g,dl,r	19 g,dl,r
	0.01 lb ai/gal			0.23 g,dl	0.025 g,dl	44 g,dl	130 g,dl	0.0034 r	580 r	930 r	41 g,dl,r	110 g,dl,r
Sprinkler Can (14)	0.10 lb ai/gal	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
	0.06 lb ai/gal											
	0.01 lb ai/gal											
Drencher (Soil Drencher) (15)	1.0/2.0	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Flagger Risks												
Flagging (Sprays) (16)	4.0	0.010 dl	0.070	0.20 dl	0.022 dl	50dl	150 dl	0.0014 r 0.0070 nr	1400 r 290 nr	2300 r 460 nr	48 dl,r 43 dl	140 dl,r 110 dl
	2.0			0.10 dl	0.011 dl	100 dl	290 dl	Not needed	Not needed	Not needed	85 dl	220 dl
	0.67			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.5			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.33			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.25			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.16			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed

APPENDIX E. PPE Mitigated Occupational Short-and Intermediate-term Inhalation, Dermal and Total Risks for Dimethoate (continued)

Note: g indicates a gloved hand scenario
dl indicates addition of a double layer of protective clothing
r indicates use of a dust mist respirator
Not needed indicates that baseline MOEs ≥100 for short-term and ≥300 for intermediate-term assessment.
No Data = An exposure scenario was identified, but there are no acceptable data to complete assessment.

a Additional PPE:

1a, 1b, 1c, 1d:	Double layer of clothing (PF = 50% for the second layer) (dl), chemical resistant gloves (g), and dust-mist respirator (5 Fold PF) (r) if applicable
2a, 2b, 2c, 2d:	Double layer of clothing (PF = 50% for the second layer) (dl), chemical resistant gloves (g), and dust-mist respirator (5 Fold PF)(r) if applicable
6:	Double layer of clothing (PF = 50% for the second layer) (dl), chemical resistant gloves (g) (PF = 90%), and dust-mist respirator (5 Fold PF)(r) if applicable
7:	Double layer of clothing (PF = 50% for the second layer) (dl), chemical resistant gloves (g), and dust-mist respirator (5 Fold PF)(r) if applicable
9:	Double layer of clothing (PF = 50% for the second layer) (dl), chemical resistant gloves (g), and dust-mist respirator (5 Fold PF)(r) if applicable
12:	Double layer of clothing (PF = 50% for the second layer) (dl), chemical resistant gloves (g), and dust-mist respirator (5 Fold PF)(r) if applicable
13:	Double layer of clothing (PF = 50% for the second layer) (dl), chemical resistant gloves (g), and dust-mist respirator (5 Fold PF)(r) if applicable
16:	Double layer of clothing (PF = 50% for the second layer) (dl), and dust-mist respirator (5 Fold PF)(r) if applicable

b PHED surrogate unit exposure values from PHED V1.1, August 1998.

c Daily dermal dose (mg/kg/d) = [unit dermal exposure (mg/lb ai) * application rate (lb ai/acre) * daily acres treated * dermal absorption (11% for intermediate-term assessment and 100% for short-term assessment)]/ body weight (70 kg).

d Short-term dermal MOE = NOAEL (10 mg/kg/d) / short-term daily dermal dose. UF = 100.
Intermediate-term dermal MOE = LOAEL (3.2 mg/kg/d). UF = 300.

e Daily inhalation dose (mg/kg/d) = [unit inhalation exposure (μg/lb ai) * application rate (lb ai/acre) * daily acres treated * (1 mg/1000 μg)] / body weight (70 kg).

f Short-term inhalation MOE = NOAEL (2.0 mg/kg/d) / short-term inhalation dose. UF = 100.
Intermediate-term inhalation MOE = LOAEL (3.2 mg/kg/d) / intermediate-term inhalation dose. UF = 300.

g Total MOE = $\dfrac{1}{\frac{1}{\text{dermal MOE}} + \frac{1}{\text{inhalation MOE}}}$

APPENDIX F. Engineering Controls for Occupational Short- and Intermediate-term Dermal, Inhalation, and Total Risks for Dimethoate

Exposure Scenario (Scen. #)	Maximum Application Rate (lb ai/A)	Engineering Controls Mitigation Measures[a]										
		Unit Dermal Exposure[b] (mg/lb ai)	Unit Inhalation Exposure[b] (μg/lb ai)	Dermal				Inhalation			Total MOE[g]	
				Daily Dose[c] (mg/kg/d)		MOE[d]		Daily Dose[e] (mg/kg/d)	MOE[f]			
				Short-term (UF=100)	Int.-term (UF=300)	Short-term (UF=100)	Int.-term (UF=300)		Short-term (UF=100)	Int.-term (UF=300)	Short-term (UF=100)	Int.-term (UF=300)
Mixer/Loader Risks												
Mixing/Loading Liquids for Aerial/Chemigation Application (1a)	4.0	0.0086 (gloves)	0.083	0.17 g	0.019 g	58 g	170 g	0.0017	1200	1900	55 g	160 g
	2.0			0.086 g	0.0095 g	120 g	340 g	0.00083	2400	3900	110 g	310 g
	0.67			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.5			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.33			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.25			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.16			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
Mixing/Loading Liquids for Groundboom Application (1b)	4.0			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	2.0			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.67			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.5			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.33			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.25			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.16			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
Mixing/Loading Liquids for Airblast Sprayer (1c)	33.2			0.08	0.009	120	360	0.0008	2,500	4,100	120	330
	8.3			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	4.0			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	2.0			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.5			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.33			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed

APPENDIX F. Engineering Controls for Occupational Short- and Intermediate-term Dermal, Inhalation, and Total Risks for Dimethoate (continued)

Exposure Scenario (Scen. #)	Maximum Application Rate (lb ai/A)	Engineering Controls Mitigation Measures[a]										
		Unit Dermal Exposure[b] (mg/lb ai)	Unit Inhalation Exposure[b] (μg/lb ai)	Dermal				Inhalation			Total MOE[g]	
				Daily Dose[c] (mg/kg/d)		MOE[d]		Daily Dose[e] (mg/kg/d)	MOE[f]			
				Short-term (UF=100)	Int.-term (UF=300)	Short-term (UF=100)	Int.-term (UF=300)		Short-term (UF=100)	Int.-term (UF=300)	Short-term (UF=100)	Int.-term (UF=300)
Mixing/Loading Wettable-Powders for Aerial/Chemigation Application (2a)	2.0	0.0098 (gloves)	0.24	0.098 g	0.011 g	100 g	300 g	0.0024	830	1,300	91 g	240 g
Mixing/Loading Wettable-Powders for Groundboom Application (2b)	2.0			0.022 g	0.0025 g	450 g	1,300 g	0.00055	3,600	5,800	400 g	1,100 g
Mixing/Loading Wettable-Powders for Airblast Sprayer (2c)	2.0			0.011 g	0.0012 g	890 g	2,600 g	0.00027	7,300	12,000	800 g	2,100 g
Mixing/Loading Wettable Powders for Non-crop land adjacent to vineyards (2d)	2.0			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
Applicator Risks												
Applying Liquids with Aircraft (3)	4.0	0.005	0.068	0.1	0.011	100	290	0.0014	1,500	2,400	94	260
	2.0			0.05	0.0055	200	580	0.00068	2,900	4,700	190	520
	0.67			0.017	0.0018	600	1,700	0.00023	8,800	14,000	560	1,500
	0.5			0.013	0.0014	800	2,300	0.00017	12,000	19,000	750	2,100
	0.33			0.0083	0.00091	1,200	3,500	0.00011	18,000	29,000	1,100	3,100
	0.25			0.0063	0.00069	1,600	4,700	0.000085	24,000	38,000	1,500	4,100
	0.16			0.004	0.00044	2,500	7,300	0.000054	37,000	59,000	2,300	6,500

APPENDIX F. Engineering Controls for Occupational Short- and Intermediate-term Dermal, Inhalation, and Total Risks for Dimethoate (continued)

Exposure Scenario (Scen. #)	Maximum Application Rate (lb ai/A)	Engineering Controls Mitigation Measures[a]										
		Unit Dermal Exposure[b] (mg/lb ai)	Unit Inhalation Exposure[b] (μg/lb ai)	Dermal				Inhalation			Total MOE[g]	
				Daily Dose[c] (mg/kg/d)		MOE[d]		Daily Dose[e] (mg/kg/d)	MOE[f]			
				Short-term (UF=100)	Int.-term (UF=300)	Short-term (UF=100)	Int.-term (UF=300)		Short-term (UF=100)	Int.-term (UF=300)	Short-term (UF=100)	Int.-term (UF=300)
Applying Liquids with Helicopter Aircraft (4)		Insuffuc. data see apply liquids with aircraft)	Insuffuc. data (see apply liquids with aircraft)	Insuffuc. data (see apply liquids with aircraft)	Insuffuc. data (see apply liquids with aircraft)	Insuffuc. data (see apply liquids with aircraft)	Insuffuc. data (see apply liquids with aircraft)	Insuffuc. data (see apply liquids with aircraft)	Insuffuc. data (see apply liquids with aircraft)	Insuffuc. data (see apply liquids with aircraft)	Insuffuc. data (see apply liquids with aircraft)	Insuffuc. data (see apply liquids with aircraft)
Applying Liquids with a Groundboom Sprayer (5)	4.0	0.005	0.043	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	2.0			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.67			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.5			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.33			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.25			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.16			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
Applying Liquids Using an Paintbrush (6)	2 lb ai/gal	None	None	None	None	None	None	None	None	None	None	None
Applying Liquids Using an Airblast Sprayer (7)	33.2	0.019 (gloves)	0.45	0.08	0.009	120	360	0.0008	2,500	4,100	120	330
	8.3			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	4.0			0.043	0.0048	230	670	0.0010	1900	3100	210	550
	2.0			0.022	0.0024	460	1300	0.00051	3900	6200	410	1100
	0.5			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.33			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
Applying Ready-to-Use Liquids (8)	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data

APPENDIX F. Engineering Controls for Occupational Short- and Intermediate-term Dermal, Inhalation, and Total Risks for Dimethoate (continued)

Exposure Scenario (Scen. #)	Maximum Application Rate (lb ai/A)	Engineering Controls Mitigation Measures[a]										
		Unit Dermal Exposure[b] (mg/lb ai)	Unit Inhalation Exposure[b] (μg/lb ai)	Dermal				Inhalation			Total MOE[g]	
				Daily Dose[c] (mg/kg/d)		MOE[d]		Daily Dose[e] (mg/kg/d)	MOE[f]			
				Short-term (UF=100)	Int.-term (UF=300)	Short-term (UF=100)	Int.-term (UF=300)		Short-term (UF=100)	Int.-term (UF=300)	Short-term (UF=100)	Int.-term (UF=300)
Applying Liquids to Non-crop land adjacent to vineyards (rights-of-way data) (9)	2			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed

APPENDIX F. Engineering Controls for Occupational Short- and Intermediate-term Dermal, Inhalation, and Total Risks for Dimethoate (continued)

Exposure Scenario (Scen. #)	Maximum Application Rate (lb ai/A)	Engineering Controls Mitigation Measures[a]										
		Unit Dermal Exposure[b] (mg/lb ai)	Unit Inhalation Exposure[b] (μg/lb ai)	Dermal				Inhalation			Total MOE[g]	
				Daily Dose[c] (mg/kg/d)		MOE[d]		Daily Dose[e] (mg/kg/d)	MOE[f]			
				Short-term (UF=100)	Int.-term (UF=300)	Short-term (UF=100)	Int.-term (UF=300)		Short-term (UF=100)	Int.-term (UF=300)	Short-term (UF=100)	Int.-term (UF=300)
Mixer/Loader/Applicator Risks												
Soil Injection (10)	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Backpack Sprayer and Knapsack Sprayer (11)	0.10 lb ai/gal	NF	NF	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.06 lb ai/gal			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.01 lb ai/gal			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
Low Pressure Handwand (12)	0.10 lb ai/gal	NF	NF	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.06 lb ai/gal			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.01 lb ai/gal			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
High Pressure Handwand (13)	0.10 lb ai/gal	NF	NF	None	None	None	None	None	None	None	None	None
	0.06 lb ai/gal			None	None	None	None	None	None	None	None	None
	0.01 lb ai/gal			None	None	None	None	None	None	None	None	None

APPENDIX F. Engineering Controls for Occupational Short- and Intermediate-term Dermal, Inhalation, and Total Risks for Dimethoate (continued)

Exposure Scenario (Scen. #)	Maximum Application Rate (lb ai/A)	Engineering Controls Mitigation Measures[a]										
		Unit Dermal Exposure[b] (mg/lb ai)	Unit Inhalation Exposure[b] (μg/lb ai)	Dermal				Inhalation			Total MOE[g]	
				Daily Dose[c] (mg/kg/d)		MOE[d]		Daily Dose[e] (mg/kg/d)	MOE[f]			
				Short-term (UF=100)	Int.-term (UF=300)	Short-term (UF=100)	Int.-term (UF=300)		Short-term (UF=100)	Int.-term (UF=300)	Short-term (UF=100)	Int.-term (UF=300)
Sprinkler Can (14)	0.10 lb ai/gal	NF	NF	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
	0.06 lb ai/gal			No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
	0.01 lb ai/gal			No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Drencher (Soil Drencher) (15)	1.0/2.0	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Flagger Risks												
Flagging (Sprays) (16)	4.0	0.0050	0.043	0.1	0.011	100	290	0.00086	2,300	3,700	96	270
	2.0			0.05	0.0055	200	580	0.00043	4700	7,400	190	540
	0.67			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.5			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.33			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.25			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed
	0.16			Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed	Not needed

"Not needed" indicates that MOEs were acceptable at either baseline or with PPE.
"None" indicates that no engineering controls are available for this scenario.

a Engineering Controls include:
- 1a, 1b, 1c, 1d: Closed mixing, single layer clothing, and chemical resistant gloves (empirical data are based on the use of chemical-resistant gloves)
- 2a, 2b, 2c, 2d: Water soluble bags, single layer of clothing, and chemical-resistant gloves
- 3: Enclosed cockpit, single layer of clothing, no gloves (engineering controls are the only application scenario for this application method for which data are available)
- 5: Enclosed cab, single layer of clothing, no gloves
- 7: Enclosed cab, single layer of clothing, and chemical-resistant gloves (empirical data are based on the use of chemical-resistant gloves)
- 16: Enclosed vehicle (PF = 90% for vehicle or other suitable engineering control), single layer of clothing, and no gloves

b PHED surrogate unit exposure values from PHED V1.1, August 1998.

c Daily dermal dose (mg/kg/d) = [unit dermal exposure (mg/lb ai) * application rate (lb ai/acre) * daily acres treated * dermal absorption (11% for intermediate-term assessment and 100% for short-term assessment)]/ body weight (70 kg).

d Short-term dermal MOE = NOAEL (10 mg/kg/d) / short-term daily dermal dose. UF = 100.

Intermediate-term dermal MOE = LOAEL (3.2 mg/kg/d). UF = 300.

e Daily inhalation dose (mg/kg/d) = [unit inhalation exposure (μg/lb ai) * application rate (lb ai/acre) * daily acres treated * (1 mg/1000 μg)] / body weight (70 kg).

f Short-term inhalation MOE = NOAEL (2.0 mg/kg/d) / short-term inhalation dose. UF = 100.
Intermediate-term inhalation MOE = LOAEL (3.2 mg/kg/d) / intermediate-term inhalation dose. UF = 300.

g Total MOE = $\dfrac{1}{\frac{1}{\text{dermal MOE}} + \frac{1}{\text{inhalation MOE}}}$

Appendix G-1. Parameters of Clean Crop® Dimethoate 400 Studies Used In Postapplication Assessment

Crop/ MRID Number	Study Location	Days included in Regression Analysis[a]	Half Life of Dimethoate+ Omethoate Residues	m	b	R^2 Value
Lettuce MRID 446903-01	California	not needed	2.2	not needed	not needed	not needed
	Florida	not needed	0.66[b]	not needed	not needed	not needed
	Pennsylvania	not needed	0.66[b]	not needed	not needed	not needed
Tomatoes MRID 446903-02	California	not needed	2.6	not needed	not needed	not needed
	Florida	not needed	0.58	not needed	not needed	not needed
	Pennsylvania	not needed	0.60	not needed	not needed	not needed
Grapes MRID 447882-01	New York	0-35 days	1.54	-0.449	-0.061	0.94
	Washington	0-35 days	4.92	-0.141	-0.359	0.86
	California	0-35 days	4.71	-0.147	-1.182	0.84
Apples MRID 448276-01	New York	0-35 days	6.42	-0.108	0.577	0.95
	Michigan	0-28 days	4.58	-0.151	0.380	0.95
	Washington	0-35 days	9.15	-0.076	0.636	0.88

Footnotes:

"Not needed" means regression analysis was not used in the postapplication assessment; actual DFR values were used instead.

a Natural log transformed data (after 2nd application) from days with one or more replicate >LOQ were used in the regression analysis. Days in which ≥ two of the replicates had values < LOQ were not included in the regression. Residues were still detectable after 35 days in the apple study, therefore, all replicates were used in the regression.

b Omethoate residues were all < LOQ at these sites.

Appendix G-2. Predicted DFR Levels Based on Actual DFRs Detected After Clean Crop® Dimethoate 400 Application to Grapes and Apples

Sample Interval (DAT)[a]	Grape DFR μg/cm^2[b] Application rate = 1.0 lb ai/acre			Apple DFR μg/cm^2[c] Application rate = 1.0 lb ai/acre		
	California	Washington	New York	Michigan	New York	Washington
0	0.31	0.7	1.1	1.46	1.78	1.89
1	0.26	0.61	0.68	1.26	1.60	1.75
2	0.23	0.53	0.43	1.08	1.43	1.62
3	0.2	0.46	0.28	0.93	1.29	1.50
4	0.17	0.4	0.18	0.80	1.16	1.39
5	0.15	0.35	0.11	0.69	1.04	1.29
6	0.13	0.3	0.072	0.59	0.93	1.20
7	0.11	0.26	0.046	0.51	0.84	1.11
8	0.094	0.23	0.029	0.44	0.75	1.03
9	0.082	0.2	0.019	0.37	0.67	0.96
10	0.07	0.17	0.012	0.32	0.60	0.89
11	0.061	0.15	0.0076	0.28	0.54	0.82
12	0.052	0.13	0.0049	0.24	0.49	0.76
13	0.045	0.11	0.0031	0.20	0.44	0.71
14	0.039	0.097	0.002	0.18	0.39	0.65
15	0.034	0.084	0.0013	0.15	0.35	0.61
16	0.029	0.073	0.00081	0.13	0.32	0.56
17	0.025	0.064	0.00052	0.11	0.28	0.52
18	0.022	0.055	0.00033	0.096	0.25	0.48
19	0.019	0.048	0.00021	0.083	0.23	0.45
20	0.016	0.042	0.00013	0.071	0.21	0.42
21	0.014	0.036	0.000086	0.061	0.18	0.38
22	0.012	0.031	0.000055	0.052	0.17	0.36
23	0.01	0.027	0.000035	0.045	0.15	0.33
24	0.009	0.024	0.000022	0.039	0.13	0.31
25	0.0077	0.021	0.000014	0.033	0.12	0.28
26	0.0067	0.018	9.1E-06	0.029	0.11	0.26
27	0.0058	0.016	5.8E-06	0.025	0.096	0.24
28	0.005	0.014	3.7E-06	0.021	0.086	0.23
29	0.0043	0.012	2.4E-06	0.018	0.078	0.21
30	0.0037	0.01	1.5E-06	0.016	0.070	0.19
31	0.0032	0.0089	9.7E-07	0.013	0.062	0.18
32	0.0028	0.0077	6.2E-07	0.012	0.056	0.17
33	0.0024	0.0067	4E-07	0.010	0.050	0.16
34	0.0021	0.0058	2.5R-07	0.0085	0.045	0.14
35	0.0018	0.005	1.6E-07	0.0073	0.041	0.13

[a] DAT = days after treatment.

[b] Predicted residues determined from linear regression analysis of dimethoate + omethoate grape leaves (MRID 447882-01)

[c] Predicted residues determined from linear regression analysis of dimethoate + omethoate apple leaves (MRID 448276-01)

Appendix G-3. Estimated Entry-Restricted Periods for Dimethoate (based on actual -- not predicted) DFR data from lettuce study)

Application Rate	Crop/Use	Days After Treatment	Dislodgeable Foliar Residue (DFR)[1]			Post Application Activity & Transfer Coefficient (TC)[2]	Margin of Exposure (MOE)[3] (UF = 300)			Secondary Post Application Activity & Transfer Coefficient (TC)	Margin of Exposure (MOE)[3] (UF = 300)		
			FL	PA	CA		FL	PA	CA		FL	PA	CA
0.16 lb ai/A	Peas (M)[4]	0[5]	0.083	0.22	0.40	hand harvest, stake/tie, scout, irrigate; TC = 4000[4]	770	290	160	NA for these crops	NA	NA	NA
		1	--	0.038	0.27		--	1,700	240		NA	NA	NA
		2	--	--	0.14		--	--	470		NA	NA	NA
0.25 lb ai/ A	Collards, kale, mustard greens, endive, escarole, head lettuce, leaf lettuce, spinach, swiss chard, turnips (L)[6]	0[5]	0.13	0.35	0.62	Hand harvesting, hand thinning: TC = 2500[4]	790	290	160	Scouting, irrigating: TC = 1000[4]	2,000	730	410
		1	--	0.059	0.42		--	1,700	240		--	--	--
		2	--	--	0.21		--	--	480		--	--	--

Footnotes:

[1] DFR source: lettuce study MRID # 44690301, which was conducted using an application rate of 0.25 lb ai/acre. When assessing activities involving a different application rate than was used in the study, the DFR values were adjusted proportionately to reflect different application rates. For example; peas which have a maximum application rate (AR) of 0.16 lb ai/acre,

$$\text{adjusted DFR} = \frac{\text{Lettuce DFR x 0.16 lb ai/A (AR)}}{\text{0.25 lb ai/A (AR)}}$$

[2] Transfer coefficient from Science Advisory Council for Exposure: Policy Memo #3 "Agricultural Default Transfer Coefficients," May 7, 1998.

[3] MOE = Intermediate-term LOAEL (3.2 mg/kg/d) / absorbed dermal dose (mg/kg/d), where absorbed dermal dose = DFR (μg/cm^2) x TC (cm^2/hr) x conversion factor (1 mg/1,000 μg) x exposure time (hrs) x dermal absorption (0.11) / body weight (70 kg).

[4] M = crops with *medium* potential for dermal transfer.

[5] 0 = on the day of treatment, after sprays have dried; assumed approximately 12 hours.

[6] L = crops with *low* potential for dermal transfer

Appendix G-4. Estimated Entry-Restricted Periods for Dimethoate (based on actual (not predicted) DFR data from tomato study)

Application Rate	Crop/Use	Days After Treatment	Dislodgeable Foliar Residue (DFR)[1]			Post Application Activity & Transfer Coefficient (TC)[2]	Margin of Exposure (MOE) (UF = 300)			Secondary Post Application Activity & Transfer Coefficient (TC)	Margin of Exposure (MOE) (UF = 300)		
			FL	PA	CA		FL	PA	CA		FL	PA	CA
0.33 lb ai/A	Peppers (M)[4]	0[5]	0.75	0.42	0.39	Hand harvest, stake/tie, scout, irrigate: TC = 4000	85	150	170	NA for these crops	NA	NA	NA
		1	0.048	0.055	0.28		1300	1200	220		NA	NA	NA
		2	--	--	0.060		--	--	1100		NA	NA	NA
0.5 lb ai/A	Broccoli, cabbage, cauliflower, celery, alfalfa, sorghum (L)[6]	0[5]	1.1	0.63	0.59	Hand harvest: TC = 2,500	89	160	170	Scout, irrigate: TC = 1,000	220	400	440
		1	0.073	0.083	0.43		1400	1200	240		3500	--	--
		2	--	--	0.090		--	--	1100		--	--	--
	Melons, watermelons, lentils, soybeans (M)[4]	0[3]	1.1	0.63	0.59	Hand harvest, stake/tie, scout, irrigate TC = 4,000	56	100	110	NA for these crops	NA	NA	NA
		1	0.073	0.083	0.43		880	760	150		NA	NA	NA
		2	--	--	0.09				700		NA	NA	NA
	Field corn, tomatoes, beans (excluding cowpeas) (H)[7]	0[3]	1.1	0.63	0.59	Hand harvest TC = 10,000	22	40	44	Stake/tie, scout, irrigate TC = 4,000	56	100	110
		1	0.073	0.083	0.43		350	310	59		880	760	150
		2	--	--	0.09		--	--	280		--	--	700
		5	--	--	0.074		--	--	340		--	--	--
	Potatoes	0[5]	1.1	0.63	0.59	Hand dig/harvest TC = 10,000	22	40	44	Sort, pack TC = 2,500	89	160	170
		1	0.073	0.083	0.43		350	300	59		1400	1200	240
		2	--	--	0.090		--	--	280		--	--	1100
		5	--	--	0.074		--	--	340		--	--	--
	Cotton, safflower	0[5]	1.1	0.63	0.59	Late season scouting TC = 4,000	56	100	110	Early season scouting TC = 1,000	220	400	440
		1	0.073	0.083	0.43		880	760	150		3500	--	--
		2	--	--	0.09				700		--	--	--

Application Rate	Crop/Use	Days After Treatment	Dislodgeable Foliar Residue (DFR)[1]			Post Application Activity & Transfer Coefficient (TC)[2]	Margin of Exposure (MOE) (UF = 300)			Secondary Post Application Activity & Transfer Coefficient (TC)	Margin of Exposure (MOE) (UF = 300)		
			FL	PA	CA		FL	PA	CA		FL	PA	CA
0.67 lb ai/A	Wheat	0[5]	1.5	0.84	0.78	Hand harvest TC = 2,500	67	120	130	Scout, irrigate TC = 1,000	170	300	330
		1	0.097	0.11	0.58		1000	910	180		2600	--	--
		2	--	--	0.12		--	--	840		--	--	--
2.0 lb ai/A	Herbaceous Ornamentals	0[3]	4.6	2.5	2.3	Cut, harvest, ball/burlap, transplant, prune TC = 10,000	6.0	10	11	Irrigate TC = 4,000	14	25	27
		1	0.29	0.33	1.7		88	76	15		220	190	37
		2	0.17	0.16	0.36		150	160	70		380	400	180
		3	0.10	--	0.44		250	350	57		--	--	140
		5	0.010	--	0.30		2500	--	86		--	--	214
		7	--	--	0.20		--	--	130		--	--	330
		10	--	--	0.069		--	--	370		--	--	--
4.0 lb ai/A	Herbaceous Ornamentals	0[3]	9.1	5.0	4.7	Cut, harvest, ball/burlap, transplant, prune TC = 10,000	3.0	5.0	5.0	Irrigate TC = 4,000	7.0	13	14
		1	0.58	0.67	3.5		44	38	7.0		110	95	18
		2	0.34	0.32	0.72		76	80	35		190	200	88
		3	0.20	0.14	0.89		130	180	29		310	440	72
		5	0.020	0.02	0.59		1300	1300	43		--	--	110
		7	--	--	0.39		--	--	65		--	--	160
		10	--	--	0.14		--	--	180		--	--	460
		14	--	--	0.098		--	--	260		--	--	--

Footnotes:

[1] DFR source: tomato study MRID # 44690302, which was conducted using an application rate of 0.5 lb ai/acre. When assessing activities involving a different application rate than was used in the study, the DFR values were adjusted proportionately to reflect the different application rates. For example, for wheat, which has a maximum label rate of 0.67 lb ai/acre,

$$\text{adjusted DFR} = \frac{\text{Tomato DFR x 0.67 lb ai/A for wheat}}{\text{0.5 lb ai/A for tomatoes}}$$

[2] Transfer coefficient from Science Advisory Council for Exposure: Policy Memo #003 "Agricultural Default Transfer Coefficients," May 7, 1998.

[3] MOE = Intermediate-term LOAEL (3.2 mg/kg/d) / absorbed dermal dose where absorbed dose = DFR (μg/cm^2) x TC (cm^2/hr) x conversion factor (1 mg/1,000 μg) x exposure time (hrs) x dermal absorption (0.11) / body weight (70 kg).

[4] M = crops with *medium* potential for dermal transfer.

[5] 0 = On the day of treatment, after sprays have dried; assumed approximately 12 hours.

[6] L = crops with *low* potential for dermal transfer.

[7] H = crops with *high* potential for dermal transfer.

Appendix G-5. Estimated Entry-Restricted Periods for Dimethoate (Derived from Grape DFR Data, MRID No. 447882-01)

Application Rate	Crop/Use	Days After Treatment	Dislodgeable Foliar Residue (DFR)[1]			Post Application Activity & Transfer Coefficient (TC)[2]	Margin of Exposure (MOE = 300)[3]			Secondary Post Application Activity & Transfer Coefficient (TC)[2]	Margin of Exposure (MOE = 300)		
			NY	CA	WA		NY	CA	WA		NY	CA	WA
2.0 lb ai/A	Grapes	0[4]	2.1	0.61	1.4	Harvest, hand girdle, cane, tie, prune, thin, tip TC = 15,000	8	28	12	Irrigation TC =4,000	30	100	46
		1	1.4	0.53	1.21		13	32	14		47	120	52
		2	0.87	0.46	1.05		20	37	16		73	140	60
		6	0.14	0.25	0.60		120	67	28		440	250	110
		8	0.059	0.19	0.45		290	90	38		--	340	140
		9	0.037	0.16	0.39		450	100	43		--	--	160
		13	--	0.091	0.22		--	190	76		--	--	280
		14	--	0.078	0.19		--	220	87		--	--	330
		17	--	0.050	0.13		--	340	130		-	--	--
		22	--	--	0.063		--	--	270		--	--	--
		23	--	--	0.055		--	--	310		--	--	--

NA= Not Applicable

[1] DFR source: grape study MRID # 448276-01, which was conducted using an application rate of 1.0 lb ai/acre. DFR values were adjusted proportionately to reflect different application rates. Grapes have a maximum application rate (AR) of 2.0 lb ai/acre. The adjusted DFR is based on the following equation:

$$DFR = \frac{\text{Grape DFR x 2.0lbai/A}}{\text{Grape 1.0lbai/A}}$$

[2] Transfer coefficient from Science Advisory Council for Exposure: Policy Memo #003 "Agricultural Transfer Coefficients," May 7, 1998. [4]

[3] MOE = Intermediate-term dermal LOAEL (3.2 mg/kg/d) / absorbed dermal dose (mg/kg/d) when absorbed dermal dose = DFR ($\mu g/cm^2$) x TC (cm^2/hr) x conversion factor (1 mg/1,000 μg) x exposure time (hrs) x dermal absorption (0.11) / body weight(70 kg).
0 = On the day of treatment, after sprays have dried; assumed approximately 12 hours.

Appendix G-6. Estimated Entry-Restricted Periods for Dimethoate (Derived from Apple DFR Data, MRID 448276-01)

Application Rate	Crop/Use	Days After Treatment	Dislodgeable Foliar Residue (DFR)[1]			Post Application Activity & Transfer Coefficient (TC)[2]	Margin of Exposure (MOE = 300)[3]			Secondary Post Application Activity & Transfer Coefficient (TC)[2]	Margin of Exposure (MOE = 300)		
			NY	MI	WA		NY	MI	WA		NY	MI	WA
0.33 lb ai/A	Cherries, pecans	0[4]	0.59	0.48	0.62	Hand harvest, prune, prop, summer shake, rake, pole and pickup (nuts): TC = 10,000	43	53	41	NA for these crops	NA	NA	NA
		1	0.53	0.41	0.58		48	61	44		NA	NA	NA
		2	0.47	0.36	0.54		54	71	48		NA	NA	NA
		12	0.16	0.079	0.25		160	320	101		NA	NA	NA
		18	0.084	--	0.16		300	--	160		NA	NA	NA
		27	--	--	0.081		--	--	320		NA	NA	NA
0.5 lb ai/A	Citrus (foliar applications), pears, apples	0[3]	0.89	0.73	0.94	Hand harvest, prune, prop, summer shake, rake, pole and pickup (nuts) TC = 10,000	29	35	27	NA for these crops	NA	NA	NA
		1	0.80	0.63	0.88		32	40	29		NA	NA	NA
		15	0.022	0.095	0.30		150	340	84				
		19	0.11	0.041	0.22		220	--	110		NA	NA	NA
		22	0.083	--	0.17		308	--	140		NA	NA	NA
		32	--	--	0.084		--	--	300		NA	NA	NA
2.0 lb ai/A	Woody Ornamentals	0[4]	3.6	2.9	3.8	Cut, harvest, ball/burlap, transplant, prune TC = 10,000	7.1	8.7	6.7	Irrigate TC = 4,000	18	22	17
		1	3.2	2.5	3.5		8.0	10	7.3		20	25	18
		2	2.9	2.2	3.2		8.9	12	7.8		22	29	20
		18	0.51	0.19	0.97		50	130	26		130	330	66
		24	0.27	0.078	0.61		96	330	42		240	--	100
		26	0.21	--	0.53		120	--	48		300	--	120
		35	0.081	--	0.27		310	--	96		--	--	240
		38	--	--	0.21		--	--	120		--	--	300
		50	--	--	0.086		--	--	300		--	--	--

Appendix G-6. Estimated Entry-Restricted Periods for Dimethoate (Derived from Apple DFR Data, MRID 448276-01) (continued)

Application Rate	Crop/Use	Days After Treatment	Dislodgeable Foliar Residue (DFR)[1]			Post Application Activity & Transfer Coefficient (TC)[2]	Margin of Exposure (MOE = 300)[3]			Secondary Post Application Activity & Transfer Coefficient (TC)[2]	Margin of Exposure (MOE = 300)		
			NY	MI	WA		NY	MI	WA		NY	MI	WA
4.0 lb ai/A	Woody Ornamentals	0[4]	7.1	5.9	7.6	Cut, harvest, ball/burlap, transplant, prune TC = 10,000	3.6	4.4	3.4	Irrigate TC = 4,000	8.9	11	8.4
		1	6.4	5.0	7		4.0	5.1	3.6		10	13	9.9
		2	5.7	4.3	6.5		4.4	5.9	4.0		11	15	10
		22	0.66	0.21	1.4		38	120	18		96	300	45
		28	0.35	0.085	0.91		74	300	28		180	--	70
		33	0.2	--	0.62		130	--	41		320	--	100
		41	0.085	--	0.34		300	--	75		--	--	190
		47	--	--	0.21		--	--	120		--	--	300
		60	--	--	0.08		--	--	320		--	--	--
8.3 lb ai/A	Conifer Seed Nursery (Douglas fir)	0*	15	12	16	Cone harvesting TC = 10,000	1.7	2.1	1.6	Cone harvesting TC = 5,000	3.4	4.2	3.2
		1	13	10	15		1.9	2.4	1.8		3.8	4.9	3.5
		2	12	9.0	13		2.1	2.8	1.9		4.3	5.7	3.8
		29	0.64	0.15	1.7		40	170	15		79	340	29
		33	0.42	0.082	1.3		61	310	20		120	--	40
		42	0.16	--	0.65		160	--	39		320	--	78
		48	0.083	--	0.41		310	--	62		--	--	120
		60	--	--	0.17		--	--	150		--	--	310
		69	--	--	0.084		--	--	300		--	--	--
33.2 lb ai/A	Conifer Seed Nursery (Douglas fir)	0*	59	49	63	Cone harvesting TC = 10,000	0.4	0.5	0.4	Cone efficiency monitoring TC = 5,000	0.9	1.0	0.8
		1	53	42	58		0.5	0.6	0.4		1.0	1.2	0.9
		2	48	36	54		0.5	0.7	0.5		1.1	1.4	0.9
		38	0.97	0.15	3.5		26	160	7.2		52	330	14
		42	0.63	0.085	2.6		40	300	9.8		81	--	20
		55	0.16	--	0.97		160	--	26		330	--	52

Appendix G-6. Estimated Entry-Restricted Periods for Dimethoate (Derived from Apple DFR Data, MRID 448276-01) (continued)

Application Rate	Crop/Use	Days After Treatment	Dislodgeable Foliar Residue (DFR)[1]			Post Application Activity & Transfer Coefficient (TC)[2]	Margin of Exposure (MOE = 300)[3]			Secondary Post Application Activity & Transfer Coefficient (TC)[2]	Margin of Exposure (MOE = 300)		
			NY	MI	WA		NY	MI	WA		NY	MI	WA
		61	0.081	--	0.62		310	--	41		--	--	83
		78	--	--	0.17		--	--	150		--	--	300
		87	--	--	0.086		--	--	300		--	--	--

NA= Not Applicable

[1] DFR source: apple study MRID # 448276-01, which was conducted using an application rate of 1.0 lb ai/acre. DFR values were adjusted proportionately to reflect different application rates. For example, cherries and pecans have a maximum application rate (AR) of 0.33 lb ai/acre. The adjusted DFR is based on the following equation:

$$DFR = \frac{\text{Apple DFR x AR}}{\text{Apple AR}}$$

[2] Transfer coefficient from Science Advisory Council for Exposure: Policy Memo #003 "Agricultural Transfer Coefficients," May 7, 1998. [4]

[3] MOE = Intermediate-term dermal LOAEL (3.2 mg/kg/d) / absorbed dermal dose (mg/kg/d) when absorbed dermal dose = DFR ($\mu g/cm^2$) x TC (cm^2/hr) x conversion factor (1 mg/1,000 μg) x exposure time (hrs) x dermal absorption (0.11) / body weight(70 kg).
0 = On the day of treatment, after sprays have dried; assumed approximately 12 hours.

Exposure Scenario (Number)	Data Source	Standard Assumptions	Comments
Occupational Mixer/Loader Exposure			
Mixing/Loading Liquid Formulations (1a, 1b, 1c, and 1 d)	PHED V1.1	350 acres for aerial and chemigation, 80 acres groundboom, 40 acres airblast, 20 acres mistblower (conifer seed nursery) and 10 acres for non-crop land adjacent to vineyards.	**Baseline:** Dermal (72 to 122 replicates); hand (53 replicates); and inhalation (85 replicates) exposure values are all based on AB grade data. High confidence in the unit exposure value. No protection factors were needed to define the unit exposure value. **PPE:** The same dermal and inhalation data are used as for the baseline coupled with a 50% protection factor to account for an additional layer of clothing and a 5-fold protection factor to account for the use of a dust/mist respirator. Hand (59 replicates) exposure value is based on AB grade data. High confidence in the unit dermal exposure value. **Engineering Controls:** Dermal (31 replicates) exposure value is based on AB grade data. Hand (31 replicates) and inhalation (27 replicates) exposure values are based on AB grade data. High confidence in the dermal unit exposure value. Low confidence in inhalation unit exposure value. Empirical data include the use of chemical-resistant gloves. No protection factors were needed to define the unit exposure value.
Mixing/Loading Wettable Powder (2a, 2b, 2c and 2d)	PHED V1.1	350 acres for aerial and chemigation, 80 acres for groundboom, 40 acres airblast, and 10 acres for right-of-way.	**Baseline:** Dermal (22 to 45 replicates); hand (7 replicates); and inhalation (44 replicates) exposure values are all based on ABC grade data. Low confidence in the dermal unit exposure value. Medium confidence in the inhalation unit exposure value. Medium confidence in the inhalation unit exposure value. No protection factors were needed to define the unit exposure value. **PPE:** The same dermal and inhalation data are used as for the baseline coupled with a 50% protection factor to account for an additional layer of clothing and a 5-fold protection factor to account for the use of a dust/mist respirator. Hand (24 replicates) exposure value is based on ABC grade data. Medium confidence in the unit exposure value. **Engineering Controls (water soluble packets):** Dermal (6 to 15 replicates); hand (5 replicates); and inhalation (15 replicates) exposure values are all based on AB grade data for dermal and “all” grade data for hands and inhalation. Low confidence in the unit exposure value. No protection factors were needed to define the unit exposure value.

Exposure Scenario (Number)	Data Source	Standard Assumptions	Comments
Occupational Applicator Exposure			
Aircraft Application (3)	PHED V1.1	350 acres	**Baseline and PPE:** These scenarios are not considered an option for this assessment as a vast majority of agricultural aircraft are closed cab vehicles (i.e., the scenario defaults to engineering controls). **Engineering controls:** Dermal (24 to 48 replicates) and inhalation (23 replicates) exposure values are based on ABC grade data. Hand (34 replicates) exposure value is based on AB grade data. Medium confidence in the unit exposure value. No protection factors were needed to define the unit exposure
Helicopter Application (4)	Insufficient Data -- see aircraft application (3)		
Groundboom Application (5)	PHED V1.1	80 acres	**Baseline:** Dermal (23 to 42 replicates); hand (29 replicates); and inhalation (22 replicates) exposure values are based on AB grade data. High confidence in the unit exposure value. No protection factors were required to define the unit exposure value. **PPE:** The same dermal and inhalation data are used as for the baseline coupled with a 50% protection factor to account for an additional layer of clothing and a 5-fold protection factor to account for the use of a dust/mist respirator. Hand (21 replicates) exposure value is based on ABC grade data. Medium confidence in the unit exposure value. **Engineering Controls:** Dermal (20 to 31 replicates) and hand (16 replicates) exposure values are based on ABC grade data. Inhalation (16 replicates) exposure value is based on AB grade data. Medium confidence in unit exposure value. No protection factors were required to define the unit exposure value.

Exposure Scenario (Number)	Data Source	Standard Assumptions	Comments
Applying Liquids with a Paintbrush (6)	PHED V1.1	2 gallons	**Baseline:** Dermal (14 to 15 replicates) and inhalation (15 replicates) exposure values are based on C grade data. Hand (15 replicates) exposure value is based on AB grade data. Low confidence in the unit exposure value. No protection factors were required to define the unit exposure value. **PPE:** The same data are used as for the baseline coupled with a 50% protection factor to account for an additional layer of clothing; a 5-fold protection factor to account for the use of a dust/mist respirator; and a 90% protection factor to account for the use of chemical-resistant gloves. Low confidence in the unit exposure value. **Engineering Controls:** Not considered a plausible option for this assessment.
Applying Liquids with an Airblast/ Mistblower Sprayer (7)	PHED V1.1	20 acres conifer seed nursery; 40 acres all other crops	**Baseline:** Dermal (32 to 49 replicates) and inhalation (47 replicates) exposure values are based on AB grade data. Hand (22 replicates) exposure value is based on AB grade data. High confidence in the unit exposure value. No protection factors were needed to define the unit exposure value. **PPE:** The same dermal and inhalation data are used as for baseline coupled with a 50% protection factor applied to the dermal data to account for the use of an additional layer of clothing and a 5-fold protection factor was applied to account for the use of a dust/mist respirator. Hand (18 replicates) exposure value is based on AB grade data. High confidence in unit exposure value. **Engineering Controls:** Dermal (27 to 30 replicates) and hand (20 replicates) exposure values are based on AB grade data. Inhalation (9 replicates) exposure value is based on ABC grade data. Low confidence in the dermal unit exposure value. Empirical data include the use of chemical-resistant gloves.
Applying Liquids Ready-to-Use (8)	No Data	No Data	No Data

Exposure Scenario (Number)	Data Source	Standard Assumptions	Comments
Applying Liquids to Non-crop land adjacent to vineyards (rights-of-way data) (9)	PHED V1.1	10 acres	**Baseline:** Dermal (4 to 20 replicates) exposure value is based on ABC grade data. Hand (16 replicates) exposure values based on AB grade data and inhalation (16 replicates) exposure values is based on A grade data. Low confidence in the dermal unit exposure value and high confidence in the inhalation data. No protection factors were needed to define the unit exposure value. **PPE:** The same dermal and inhalation data are used as for the baseline coupled with a 50% protection factor to account for an additional layer of clothing and a 5-fold protection factor to account for the use of a dust/mist respirator. Hand (4 replicates) exposure value is based on AB grade data. Low confidence in the hands and dermal unit exposure value. **Engineering Controls:** Not considered a plausible option for this assessment.
Occupational Mixer/Loader/Applicator Exposure			
Soil Injection (10)	No Data	No Data	No Data
Backpack Sprayer (11)	PHED V1.1	40 gallons	**Baseline:** Dermal (9 to 11 replicates) and inhalation (11 replicates) exposure values are based on AB grade data. Hand data (11 replicates) exposure value is based on C grade data. Low confidence in the unit exposure value. No protection factors were needed to define the unit exposure value. Empirical data include the use of chemical-resistant gloves. **PPE:** The same dermal, inhalation, and hand data are used as for the baseline coupled with a 50% protection factor to account for the use of an additional layer of clothing and a 5-fold protection factor to account for the use of a dust/mist respirator. Low confidence in the unit exposure value for hands (11 replicates). This data is based on C grade data. **Engineering Controls:** Not considered plausible for this assessment.

Exposure Scenario (Number)	Data Source	Standard Assumptions	Comments
Low Pressure Handwand (12)	PHED V1.1	40 gallons	**Baseline:** Dermal (9 to 80 replicates) and inhalation (80 replicates) exposure values are based on ABC grade data. Hand (70 replicates) exposure value is based on all grade data. Low confidence in the dermal and hands unit exposure value. Medium confidence in the inhalation unit exposure value. No protection factors were needed to define the unit exposure value. **PPE:** The same dermal, inhalation, and hand data are used as for baseline coupled with a 50% protection factor to account for the use of an additional layer of clothing and a 5-fold protection factor to account for the use of a dust/mist respirator. **Engineering Controls:** Not considered plausible for this assessment.
High Pressure Sprayer (13)	PHED V1.1	1,000 gallons	**Baseline:** Dermal (7 to 13 replicates) are based on AB grade data and inhalation (13 replicates) exposure values are based on A grade data. Hand data is back calculated from glove data assuming gloves provide 90% protection. A 90% PF was needed to define this unit exposure value. **PPE:** The same dermal, inhalation, and hand data are used as for the baseline coupled with a 50% protection factor to account for the use of an additional layer of clothing and a 5-fold protection factor to account for the use of a dust/mist respirator. Low confidence in the unit exposure value for hands (13 replicates). This data is based on C grade data. **Engineering Controls:** Not considered plausible for this assessment.
Sprinkler Can (14)	No Data	No Data	No Data
Drencher (Soil Drench) (15)	No Data	No Data	No Data

Exposure Scenario (Number)	Data Source	Standard Assumptions	Comments
Occupational Flagger Exposure			
Flagger (16)	PHED V1.1	350 acres	**Baseline:** Dermal (18 to 28 replicates); hand (30 replicates); and inhalation (28 replicates) exposure values are based on AB grade data. High confidence in the unit exposure value. No protection factors were needed to define the unit exposure value. **PPE:** The same dermal and inhalation data are used as for the baseline coupled with a 50% protection factor to account for the use of an additional layer of clothing and a 5-fold protection factor to account for the use of a dust/mist respirator. Hand (6 replicates) exposure value is based on AB grade data. Low confidence in the unit exposure value. **Engineering Controls:** Data is based on groundboom enclosed cab. Dermal (20 to 31 replicates); hand (16 replicates); and inhalation (16 replicates) exposure values are based on ABC grade data for dermal and hands and AB grade data for inhalation. Medium confidence for hands and dermal and high confidence for inhalation.

[a] Standard assumptions are based on the activities of a typical individual over a daily 8 hour interval. Occupational scenarios reflect what individuals could accomplish in an 8 hour workday.

[b] Data quality assessments are based on the PHED grading criteria and the guidance provided in the Dec 1997 surrogate exposure table. Acceptable grades are matrices with grade A and/or B data. The PHED surrogate exposure table upon which this assessment is based was developed using the best data available in the system that are appropriate to the exposure scenario. Data confidence descriptors are assigned as follows:

High = grades A and B and 15 or more replicates;
Medium = grades A, B, and C and 15 or more replicates; and
Low = grades A, B, C, D, and E or any combination of grades with less than 15 replicates